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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,570	09/25/2003	Masanori Kira	826.1897	6791
21171	7590	06/26/2006	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			STEELMAN, MARY J	
			ART UNIT	PAPER NUMBER
			2191	

DATE MAILED: 06/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/669,570	<b>Applicant(s)</b> KIRA, MASANORI	
	<b>Examiner</b> Mary J. Steelman	<b>Art Unit</b> 2191	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/25/03</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-15 are pending.

#### ***Specification***

2. The Specification is objected to at page 9, line 19. The phrase “extracting a defined but not unused data item from the extracted data item” seems to not be worded correctly. It should recite, “extracting a defined by not used data item..” or “extracting a defined but unused data item...” Correction is requested.

The title is to be changed to “Program Optimization by Unused Data Item Extraction.”

#### ***Claim Objections***

3. Claim 8, line 3 and claim 9 line 3 recite, “setteing”, should be –setting--. Delete the second ‘e’.

Claim 3, line 6, recites “locating”, should be –located--.

Claim 4 recites, “plurality of unused data items to be merged are a data item having a hierarchical structure and a data item configuring the data item, and the data item having the hierarchical structure is configured by one data item. It is unclear which ‘data item’ the last ‘data item’ is referring to.

Clam 9 recites, “setting an item name of the new data item as no name” It is unclear to Examiner what the Applicant means. An identifier of some sort is required by a program.

#### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. It appears to Examiner that the 'storage medium' of claim 1 is intended to encompass non-statutory forms such as carrier waves and signals, as noted in the Specification at page 56, line 17.

Claims 14 and 15 are rejected under 35 U.S.C. 101 because the broadest reasonable interpretation appears that the apparatus is functional descriptive material, a program per se, which is non-statutory. Functional descriptive material claimed in combination with an appropriate computer readable medium to enable the functionality to be realized is patent eligible subject matter if it is capable of producing a useful, concrete, and tangible result when used in the computer system. The computer readable medium must be in physical form to permit the functionality to be realized with the computer.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-15 are rejected under 35 U.S.C. 102(a) as being anticipated by USPN 6,301,700B1 to Choi et al.

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Per claims 1,13, 14, and 15:

A storage medium storing a program used to direct a computer to perform optimization process of the program, the process comprising:

-extracting data items from the program;

Choi: See FIG. 5 and related text at col. 5, line 19. "The operation begins in step 501 by identifying the classes (extracting data items from the program) of objects created in the given program P." Col. 5, line 34, 6(A) illustrates a table for storing data that identifies the classes of a class hierarchy slice.

-laying out the data items in memory provided in the computer;

Choi: Col. 4, line 66-layout as graph based representation called the subobject graph. Also see FIG. 2, #222-ILG (intermediate language generation)

-extracting defined but unused data items from the extracted data items;

Choi: FIG. 5, #505-For each member lookup m in P1 determines the CH slice that is necessary to preserve the behavior of the lookup operation. Col. 14, lines 42-44, "By eliminating parts of class hierarchies such as classes, members, and inheritance relations, objects become smaller and require less memory."

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-determining whether or not a plurality of data items forming at least a part of a data item having a hierarchical structure in the unused data items can be merged into a new data item based on the layout result;

Choi: FIG. 6(C) & Col. 6, line 17, “a table for storing data that identifies the inheritance relations of a class hierarchy slice.” Col. 7, line 13, “determining which classes are needed...”

Col. 7, line 58, “In step 505, the member lookup operations...in the program P are identified and, for each member lookup operation, the part of the class hierarchy that is necessary to preserve the behavior of that member lookup operation is determined.”

-outputting a program in which the plurality of data items are merged into the new data item based on the determination result.

Choi: Col. 13, lines 22-36, “The class slicing technique used in the compilation of program in order to reduce the space and time requirements of the program. The compilation process compiles a source program thereby generating a run-time representation of the source program.

As shown in FIG. 2, the compilation process 210 accepts as an input (I) 212 a source program, and operates on it to an end of generating an output (O) 214 comprising a run-time representation of the source program. The run-time representation is typically executable on a specific computer architecture. The compilation process 210 typically includes front end processing (FE) 218a symbol table 220 for recording information about symbols in the input program, intermediate language generation (ILG) 222, optimization (OPT) 224 and back end processing (BE) 226.

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Per claim 2:

-the process further comprising: said plurality of unused data items to be merged are laid out in adjacent areas in the memory.

Choi: Col. 4, line 66-layout as graph based representation called the subobject graph (adjacent areas in the memory). Also see FIG. 2, #222-ILG (intermediate language generation) Col. 3, line 6, "loaded into RAM 14 for execution by the CPU 10." See FIG. 4, subobject graph. Col. 14, line 21, "The class slicing technique of the present invention is preferably integrated in to the front end processing stage 218 of the compilation process 210...thereby eliminating classes, members, and inheritance relations that are not necessary for the execution of the program P."

Per claim 3:

-plurality of unused data items to be merged are data items forming a part of another data item having a hierarchical structure, and locating in an identical hierarchical level in the hierarchical structure.

Choi: Col. 12, lines 46-48, "the part of the class hierarchy between [D;S] and [D;S] is added to the class hierarchy slice data. This consists of just class S. Col. 13, line 17, "The resulting class hierarchy slice is shown in FIG. 7(D)."

Per claim 4:

-plurality of unused data items to be merged are a data item having a hierarchical structure and a data item configuring the data item, and the data item having the hierarchical structure is configured by one data item.

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Choi: FIG. 6(C) & Col. 6, line 18, “The table includes a plurality of entries each corresponding to an inheritance relation between a pair of classes, wherein one of the classes of the pair (i.e., the derived class) is derived, either through virtual or non-virtual inheritance, from the other class of the pair (the base class).”

Per claim 5:

-in the merge, deleting a code for declaration of a plurality of unused data items from the program; and adding code for declaration of a new data item.

Choi: Col. 14, line 20, “The class slicing technique...integrated into the front end...of the compilation process...thereby eliminating classes, members, and inheritance relations that are not necessary for the execution of the program P.” Col. 14, line 3, “the BE (back end stage of the compiler) stage 226 generates executable code that is functionally equivalent...”

Per claim 6:

Choi disclosed adding classes and inheritance relations to the slice, but did not discuss the length of the data item.

Choi: col. 5, line 22, “for each type-cast in the program P, class hierarchy slice data that identifies the part of the class hierarchy that is necessary to preserve the behavior of the type cast operation is generated and stored in persistent storage for subsequent use.

Choi failed to explicitly disclose:

-setting an item length of the new data item based on item lengths of the plurality of unused data items to be merged.



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Official Notice is taken that a defined type is associated with a length of a data item.

Per claim 7:

-when data types of a plurality of unused data items to be merged are all the same, setting a data type of the new data item to be the same as the data types of the plurality of unused data items to be merged.

Choi: See col. 4, line 35 for a discussion on naming scheme of various subobjects. "The most derived class of such a subobject is Z."

Per claim 8:

-setting a data type of the new data item as having a smallest storage area.

Choi: See col. 4, line 35 for a discussion on naming scheme of various subobjects. "The most derived class of such a subobject is Z." The data type is set as the most derived class type.

Per claim 9:

-setting an item name of the new data item as no name.

Choi: See col. 4, line 35 for a discussion on naming scheme of various subobjects. Additional examples are found at col. 8, lines 52, "the set of all subobjects with the combination can be identified from the subobject graph."

Per claim 10:

-setting an item name of the new data item based on any of the plurality of unused data items to

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be merged.

Choi: See col. 4, line 35 for a discussion on naming scheme of various subobjects. Additional examples are found at col. 8, lines 52, “the set of all subobjects with the combination can be identified from the subobject graph.”

Per claim 11:

-changing a layout of the data item in the memory based on a changed program.

Choi: Col. 4, line 66-The layout of objects is depicted in a graph in an intermediate form in the front end of a compiler. Col. 14, line 21, “The class slicing technique...integrated into the front end processing stage 218 of the compilation process 210...thereby eliminating classes, members, and inheritance relations that are not necessary...” Col. 14, line 3, “the BE stage 226 generates executable code that is functionally equivalent to the intermediate language form of the program.”

Per claim 12:

-deleting code for definition of an unused data item from a changed program.

Choi: Col. 14, line 24, “eliminating classes, members, and inheritance relations...”

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Steelman, whose telephone number is (571) 272-3704. The examiner can normally be reached Monday through Thursday, from 7:00 AM to 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached at (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman



06/21/2006